Precision Landing Exploration Technology (PLANET) Demonstration

Problem Statement

- PLANET will mature Autonomous Guidance, Navigation, and Control (AGNC) technology required for precision lunar and planetary landing.
- sRLV flights allow the AGNC to fly lunar/planetary-like landing trajectories exercising the system in the most relevant terrestrial environment.
- Extends sRLV capabilities and enables broad range of future technology demonstrations for systems such as those needed for Autonomous Landing and Hazard Avoidance

Technology Development Team

- PI: Douglas Zimpfer, Draper Laboratory, dzimpfer@draper.com
- Funding: NASA FOP
- Technology Partner: NASA ALHAT Team

Proposed Flight Experiment

Experiment Readiness:

- The experiment is currently ready to fly

Test Vehicles:

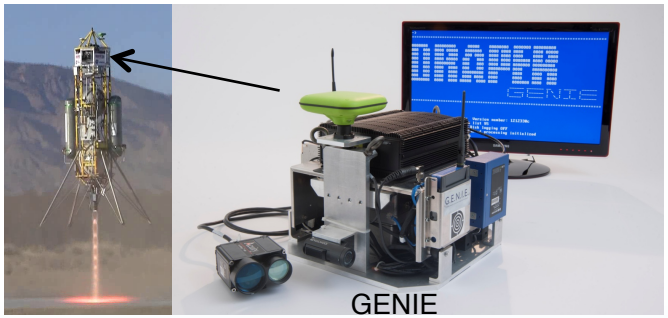
- sRLV

Test Environment:

- An sRLV that can be controlled by the payload to fly the desired lunar or planetary precision landing trajectories in order to properly exercise the sensors and algorithms.

Test Apparatus Description:

- The key enabler for PLANET is the Guidance Embedded Navigator Integration Environment (GENIE) pictured below. GENIE is a stand-alone avionics package that controls the sRLV and houses the sensors and algorithms required to enable precision landing.



GENIE

Technology Maturation

- The technology is currently TRL5. GENIE will be TRL6 after flying precision planetary/ lunar landing trajectories at proper speeds and altitudes
- Maturation Steps

1. Adapt and integrate GENIE AGNC system to sRLV Flight Vehicle
2. Perform series of flights demonstrating precision landing capability

Objective of Proposed Experiment

- 1-Mature AGNC, 2-Extend capability of sRLV for EDL trajectories, 3-Enable future technology demonstrations
- Data obtained will be used to determine robustness of GENIE and the AGNC system. These results will then be used to determine future design enhancements.

Technology Areas Addressed: TA4 Robotics, Tele-Robotics and Autonomous Systems; TA7 Human Exploration Destination Systems TA9 Entry, Descent, and Landing Systems; TA11 Modeling, Simulation, Information Technology and Processing